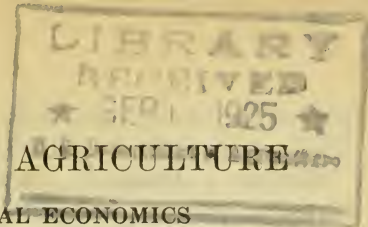


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345



U. S. DEPARTMENT OF AGRICULTURE

BUREAU OF AGRICULTURAL ECONOMICS

HENRY C. TAYLOR, Chief

SERVICE AND REGULATORY ANNOUNCEMENTS NO. 94 OFFICIAL STANDARDS OF THE UNITED STATES FOR AMERICAN COTTON LINTERS

I. LETTER TRANSMITTING THE PROPOSED GRADES OF THE OFFICIAL STANDARDS OF THE UNITED STATES FOR AMERICAN COTTON LINTERS, TO THE SECRETARY OF AGRICULTURE FOR HIS APPROVAL

BUREAU OF AGRICULTURAL ECONOMICS,
Washington, D. C., June 26, 1925.

Hon. W. M. JARDINE,
Secretary of Agriculture.

SIR: Herewith I am sending you the grades we are proposing as the official standards of the United States for American cotton linters. These are to become effective on August 1, 1926, provided they meet with your approval, and provided they are signed by you prior to August 1, 1925. We would suggest that prior to August 1, 1926, they be considered as constituting tentative standards for American cotton linters.

These grades were devised and prepared at the request of the Interstate Cottonseed Crushers' Association and have met with the approval of that association as well as with the approval of the principal consumers of linters.

Very truly yours,

LLOYD S. TENNY,
Acting Chief of Bureau.

Approved:
R. W. WILLIAMS,
Solicitor.

II. PUBLIC NOTICE ESTABLISHING THE GRADES CONSTITUTING THE OFFICIAL STANDARDS OF THE UNITED STATES FOR AMERICAN COTTON LINTERS

Pursuant to the authority conferred upon me by section 6 of the United States cotton standards act approved March 4, 1923 (42 Stat. L., p. 1517), I, R. W. Dunlap, Acting Secretary of Agriculture, do hereby establish, promulgate and give public notice of standard

grades for American cotton linters to become effective August 1, 1926, as hereinafter set forth.

Section 1, Grade 1.—Grade 1 shall be American cotton linters, which in grade is within the range represented by a set of samples in the custody of the United States Department of Agriculture in a container marked "Original Official Standard of the United States for American Cotton Linters, Grade 1."

Section 2, Grade 2.—Grade 2 shall be American cotton linters, which in grade is within the range represented by a set of samples in the custody of the United States Department of Agriculture in a container marked "Original Official Standard of the United States for American Cotton Linters, Grade 2."

Section 3, Grade 3.—Grade 3 shall be American cotton linters, which in grade is within the range represented by a set of samples in the custody of the United States Department of Agriculture in a container marked "Original Official Standard of the United States for American Cotton Linters, Grade 3."

Section 4, Grade 4.—Grade 4 shall be American cotton linters, which in grade is within the range represented by a set of samples in the custody of the United States Department of Agriculture in a container marked "Original Official Standard of the United States for American Cotton Linters, Grade 4."

Section 5, Grade 5.—Grade 5 shall be American cotton linters, which in grade is within the range represented by a set of samples in the custody of the United States Department of Agriculture in a container marked "Original Official Standard of the United States for American Cotton Linters, Grade 5."

Section 6, Grade 6.—Grade 6 shall be American cotton linters, which in grade is within the range represented by a set of samples in the custody of the United States Department of Agriculture in a container marked "Original Official Standard of the United States for American Cotton Linters, Grade 6."

Section 7, Grade 7.—Grade 7 shall be American cotton linters, which in grade is within the range represented by a set of samples in the custody of the United States Department of Agriculture in a container marked "Original Official Standard of the United States for American Cotton Linters, Grade 7."

Section 8, Hull Fiber.—American cotton linters the fiber of which is below that shown in Grade 7 herein established shall be designated as "Hull Fiber."

Section 9, Compound Grades.—Bales of American cotton linters, which in grade show a variation equal to that shown in any two adjacent grades of those described in sections 1 to 7, inclusive, of this order, shall be designated by the compounded name of each of such two adjacent grades.

Section 10, Mixed Packed.—Bales of American cotton linters, which in grade show a variation greater than that shown in any two adjacent grades of those described in sections 1 to 7, inclusive, of this order, shall be designated as "Mixed packed."

Section 11, Extraneous Matter.—American cotton linters that contain more foreign matter than is represented in the grades herein established shall be designated as "Off grade."

In testimony whereof I have hereunto set my hand and caused the official seal of the Department of Agriculture to be affixed in the city of Washington this 7th day of July, 1925.

[SEAL.]

R. W. DUNLAP,
Acting Secretary of Agriculture.

III. AMERICAN COTTON LINTERS

By G. S. MELOY, *Specialist, Cottonseed Products*

The practice of reginning cottonseed was developed as a concomitant to the cottonseed-oil-pressing industry. It was undertaken primarily as one of the steps in conditioning the seed for oil extraction, but it was found that the fiber remaining attached to the seed, after the cotton had been removed at the gin, had an economic value itself. It soon became the practice, therefore, to bale this fiber and offer it for sale. Previous to the year 1900 the number of bales were negligible. In that year this fiber amounted to only a little over 100,000 bales of 500 pounds each, with an average value of less than 1 cent a pound. The production has steadily increased to approximately 1,000,000 bales yearly, which, during the season of 1924-25, brought a price ranging from 2½ to 12½ cents per pound, depending upon the grade. During each of the years 1916, 1917, and 1918 over 1,300,000 bales of this fiber were recovered from cottonseed at the oil mills of the South.

Some uncertainty seems to exist in commercial channels as well as in the minds of the public as to the nature of the residual fibers of cottonseed formerly called "regins," but now commonly called linters. The industry is comparatively young and its nomenclature is still somewhat indefinite. For these reasons, in connection with the establishment of standard grades for linters, some of the attributes of the residual fibers are discussed in order to differentiate this commodity from the cotton of commerce.

Cotton hair.—The seed of all varieties of American upland cotton produce two distinct types of cotton hair. First in point of use and value is the long creamy white hair or fiber, generally called lint or cotton, the length of which is a varietal characteristic and ranges from five-eighths of an inch to about 1½ inches. The second type of hair is a comparatively short fiber generally spoken of as fuzz.

This fuzz usually has considerable color, green, buff, and gray predominating. Under the microscope it can be distinguished from the long fiber by the comparative smoothness or lack of convolutions of the cell, its broadness where attached to the seed, its shortness and the rapidity and regularity with which it tapers to the tip. The long hairs or cotton, by contrast, are generally somewhat more convoluted, have a comparatively uniform width for a considerable portion of their length, and end in a relatively long tapering point.

Residual fibers, robust and flaccid hairs.—Ginning is the process of removing the long hairs from the seed, though more or less of the short hair or fuzz is also removed, depending upon whether the seed are properly cured or not, and the mechanical condition of the gin and its operation. Some of the long hairs escape through the gin without being detached from the seed. These are usually the softer hairs that because of their flaccidness have not acquired the wiriness and resiliency usually acquired during the drying out and curing of the fibers after the bolls open. The wiriness and resiliency are manifested by the unfolding and fluffing of the more robust fibers, while the flaccid fibers remain matted about the seed. Under the microscope they appear generally more translucent than the robust fibers and in cross section are ribbon-shaped and show very few of the thickened longitudinal ridges that are irregularly distributed throughout the length of most normal cotton fibers. Such ridges as are to be seen are not as pronounced as those seen in robust fibers.

The flaccidity of these fibers may be natural or may possibly be due, sometimes, to arrested development caused by the abortion of the seed or by injury to the young boll. Occasionally, however, soft weak fibered mutants are found in fields of cotton. Such plants are chiefly characterized by their long, soft, comparatively weak, olive-buff fibers. Frequently the value of these plants has been mistaken and they have been carefully isolated and whole fields grown only to find that the fiber is of little value in the usual channels of the cotton trade. In color the fiber might be described as weathered or of a grayish or olive buff. To what extent such plants are to be found in the fields has not been ascertained, nor has a determination been made as to what part of the residual fibers they constitute.

The quantity of these flaccid fibers that escapes ginning bears a direct relation to the length of staple of the cotton before ginning and an indirect relation to the carefulness of the ginning operation. A careful ginner, for instance, will allow the softer unfluffed fibers to pass unginned, since because of their softness and color they reduce the grade and value of the cotton. The longer the staple the greater the relative value of grade and, therefore, the greater the demand for care in ginning, with a resultant increase in the permitted escapement of faulty, matted, or unfluffed fibers.

In the ginning of short staples the amount of residual fiber, both long fiber and fuzz, remaining on the seed after ginning depends upon the sharpness and the speed of the saws and the tightness or hardness of the seed roll in the gin breast. In short, the harder the roll and the faster and sharper the saws the closer the seed are denuded. It is evident that some of both flaccid fibers and fuzz are regularly taken off the seed in ginning, since card fly is composed very largely of such fiber.

Practically every lot of ginned seed, therefore, varies from every other lot in the amount and character of the residual fibers contained. The amount of residual fibers on seed of different Upland varieties, ginned on the same gin and under similar conditions, has been found to range from 5.2 per cent to 14.8 per cent of the weight of the seed before delinting. During the winter of 1924-25 many samples of seed were sent to the Department of Agriculture by oil mills located in different sections of the Cotton Belt. The residual fiber on these samples was found to range from 5.2 per cent to 14.4 per cent.

The consignments of cottonseed that reach the oil mills, therefore, vary considerably in character. At the mills the seed are first freed of foreign matter and then reginned or "delinted" on linter machines. The linter machine is similar in construction and operation to a saw gin, so that here again the amount of fiber or "linters" removed varies, depending upon the sharpness and speed of the saws, the hardness of the seed roll and the rate of escapement of the seed from the reginning machines.

Cutting linters.—Reginning, or delinting, is more generally spoken of as "cutting." Except as influenced by the variableness of the residual fiber content as indicated above, the character of the linters is determined largely by the cut per ton or the number of pounds of linters secured from a ton of seed.

First cuts.—Cuts ranging from 20 to 50 pounds per ton have generally become known as "first cuts" or "first-cut linters."

Mill-runs.—Cuts ranging from about 35 to 100 pounds or more per ton become known as "mill-runs" or "mill-run linters."

Second cuts.—After a first cutting, especially if not over 35 pounds per ton have been removed, the seed are frequently passed through the linter machine a second time. The linters thus produced are known as "second cuts." The total amount of linters cut per ton ranges from about 30 pounds to as high as 200 pounds.

Hull fiber.—It has not been found generally economical to attempt a complete denuding of the seed preparatory to crushing. A heavy cut mill-run or a second cut is usually sufficient for practical purposes, so that a considerable portion of the fuzz is still attached to the seed coats or hulls when the seed are crushed and the kernels and

hulls separated. The demand for cellulose has been so acute in recent years that a number of mills have installed special apparatus for recovering the fiber from the decorticated hulls. This type of fiber has become known generally as "hull fiber."

Character of linters.—Linters that contain a large proportion of the long type of fiber are to be distinguished from commercial cotton only by their softness and color. As the proportion of long fibers is reduced with a corresponding increase in the proportion of the short type or fuzz, linters begin to assume the color of the fuzz. There is, therefore, a considerable range of color in linters. Buff seems to be the base. The principal shades include pinkish cream, grayish cream, pinkish-orange buff, tan buff, grayish buff, olive, and olive buff.

CLASSES OF CONSUMERS

The consumers of linters may be divided into three general groups—spinners, felters, and chemical users. The character of the linters used by each of these groups varies and overlaps. The utilization is based primarily on the relative proportions of the two types of fibers present.

Probably the largest consuming group at present is composed of the felters. This group includes the makers of batting, mattresses, cushions, wadding, paper, etc. It utilizes all grades of linters.

Linters containing the largest portion of long fibers is spun and made into cheaper grades of cloth and twine, lamp wicks, etc. It is also bleached, sterilized, and battled for use as absorbent cotton or for other similar purposes.

In the chemical group are included all consumers that use cellulose as the base of their products. Cotton linters contain from 70 to 85 per cent of available cellulose. This group utilizes chiefly mill-runs, second cuts, and hull fiber. During the past decade the uses to which linters have been put by this group have made an unprecedented growth. New products are being discovered almost daily. The second type of fiber or fuzz seems to be preferred for chemical purposes, especially since its low cost makes it compete favorably with other sources of cellulose.

The reasons for cutting linters.—Linters was long looked upon as an unwelcome by-product of the cottonseed-crushing industry. The economy of delinting the seed is still debated. For many years it was classed with waste and handled chiefly by waste and junk dealers. Under such circumstances the cutting of linters was usually attended with carelessness and neglect.

The cutting or delinting was undertaken, when done at all, primarily to save oil and to facilitate separating out the kernels or meats from which the oil is extracted. To secure the meats, the seeds are crushed or cut and the hulls separated from the kernels. During the

crushing or cutting of the seed the residual fibers absorb more or less oil, and during the sifting are likely to become felted and to enmesh portions of the kernels, which can not then be recovered. The absorbed oil and entrapped kernels constitute a loss. The sale value of linters must more than cover this loss and the cost of cutting; otherwise the cutting is not economical.

As received by the oil mills cottonseed always contains more or less foreign matter consisting of sand and dirt, leaves and sticks, stones, and even hardware. For many years, as linters was considered of little value, it was customary to eliminate only such of the foreign matter as might damage the linter machines and to permit the residue to pass through into the linters. This, of course, resulted in some very trashy material. As new uses for linters were discovered the demand grew and the importance of producing linters free from foreign matter became more evident. More and more attention is consequently being given to the subject of thoroughly cleaning the seed before delinting.

Request for standard grades.—The enormous growth in production coupled with the unparalleled development in the uses and demand for linters has gradually taken the industry out of the waste class and given it the character of a special industry. This resulted in the introduction and unanimous passage of a resolution by the Interstate Cotton Seed Crushers' Association at its annual convention in New Orleans, May 5 to 9, 1924, of a resolution requesting the Department of Agriculture to determine upon and to establish standard grades for linters.

The cooperation of all branches of the industry—producers, dealers, and consumers—was either volunteered or immediately granted upon application and was of invaluable assistance in the study of the subject. Many conferences were held at which ideas as to grading and the difficulties encountered in the present stock of linters by each consumer in his particular field were thoroughly discussed. All classes of consumers furnished the department with samples of linters of the types they preferred.

A number of dealers also sent the department sets of types used by them in trading. On the opening of the cutting season of 1924–25 generous samples were furnished by representative oil mills located in every section of the Cotton Belt. Some mills sent in samples weekly throughout the season.

With this information and material in hand the following plan of graduating linters was developed:

SCHEME OF GRADING

There are seven basic grades, ranging from the highest first cuts to the shortest second cuts. Each box representing a grade is made up of 12 samples numbered across from the upper left-hand sample to the lower right-hand sample. Samples Nos. 1, 2, 3, and 4 in each box represent the character of the linters produced in the Southeastern States; samples Nos. 5, 6, 7, and 8 the character of the linters produced in the Mississippi Valley States; and Nos. 9, 10, 11, and 12 the character of the linters produced in the Western States. The samples in each row across are graded down from left to right. Samples Nos. 1, 5, and 9 in each of the lower grades are approximately equal to samples Nos. 4, 8, and 12 in the next higher grade. The graduation is based chiefly on the proportions of long fiber and fuzz with a slight increase in the amount of foreign matter permitted. Each box as a whole shows the expectant variation both in the character of the fibers and in the amount of foreign matter generally to be found in bales of linters turned out by carefully managed oil mills.

As stated, the grades are based on the relative proportions of the two types of cotton hair. Grade No. 1 is composed of linters in which a very large portion of long type of fiber is present, and grade No. 7 of linters in which the short type of fuzz predominates and in which practically all of the long type of fibers present have been more or less broken.

In grades Nos. 2 and 3 the presence of the fuzz is recognized by the increase in color as well as by the reduction in the amount and by the broken condition of the long type of fibers.

Grade No. 4 is about an equal blending of both types of fibers. In grade No. 5 there is sufficient of the long type distributed through the samples to act as a good binder, together with some strands and flakes.

In Grade No. 6 the fuzz predominates and the long type is confined almost entirely to strands and flakes.

No. 7 is made up almost exclusively of the second type of fiber or fuzz, together with barely enough of the long fibers to hold the samples in shape.

Heretofore Grades Nos. 1 and 2 have generally been called first cuts. The samples in Grade No. 3 have been called first cuts by some and mill-runs by others.

Grade No. 4 is composed of samples heretofore known as mill-runs.

Grade No. 5 contains mill-runs and second cuts.

Grades Nos. 6 and 7 are composed of samples heretofore known as second cuts.

Before issuing the order of the Secretary of Agriculture establishing the above-described grades as the Official Standards of the

United States for American Cotton Linters, the boxes were displayed and explained at the annual convention of the Better Bedding Alliance of America in Chicago, Ill., January, 1925, and also at the annual convention of the Interstate Cottonseed Crushers' Association held in New Orleans, La., May, 1925. At each of these conventions the proposed grades were approved and their adoption recommended. In addition the grades have been studied and approved by many individuals financially interested in linters.

While standard grades should result in a common language on which trading may be done, they will doubtless be found useful, in the first instance, as a guide for cutting linters by the oil mills. In the hands of middlemen and consumers as well as producers Grade No. 4 should be found useful as a basis grade on which quotations for linters might be established. In practice differences "On" and "Off" of the basis grade will be readily determined.

It is expected that those interested in the production, purchase, and sale and consumption of linters will make joint rules covering the permissible range of grades constituting a good delivery on a specific contract and that the rules of boards of arbitration will be amended to recognize and facilitate the use of the standard grades.

